



Ekalaka Germplasm bur oak orchard tree. Photo by Joseph Scianna

NOTICE OF RELEASE OF

EKALAKA GERMPLASM BUR OAK

SELECTED CLASS PRE-VARIETAL RELEASE

| Joseph D Scianna and James S Jacobs

ABSTRACT

A Selected Class pre-varietal release of bur oak (*Quercus macrocarpa* Michx. [Fagaceae]) designated as Ekalaka Germplasm bur oak has been released for use in the Northern Great Plains and Intermountain West for windbreaks, shelterbelts, riparian forest buffers, wildlife habitat plantings, Xeriscapes®, and other conservation plantings. This selection is a bulk of 9 indigenous seed sources from Montana, North Dakota, and South Dakota selected for superior percentage survival, rate of height growth, and vigor rating compared with other seed sources tested at Bridger, Montana. Ekalaka Germplasm bur oak can be used in many conservation applications in place of Russian-olive (*Elaeagnus angustifolia* L. [Elaeagnaceae]) and green ash (*Fraxinus pennsylvanica* Marsh. [Oleaceae]) given adequate soil aeration and low salinity.

Scianna JD, Jacobs JS. 2010. Notice of release of Ekalaka Germplasm bur oak selected class pre-varietal release. *Native Plants Journal* 11(1):77–78, 80–82.

KEY WORDS

Quercus macrocarpa, Fagaceae

NOMENCLATURE

USDA NRCS (2009)

COLLABORATORS

USDA Natural Resources Conservation Service Bridger Plant Materials Center, Bridger, Montana; Montana Agricultural Experiment Stations, Montana State University, Bozeman; Wyoming Agricultural Experiment Stations, and the University of Wyoming, Laramie.



Species | *Quercus macrocarpa* Michx.

Common Name | bur oak

Plant Symbol | QUMA2

Accession Number | 9087732

Ekalaka Germplasm bur oak (*Quercus macrocarpa* Michx. [Fagaceae]), a Selected Class pre-varietal release, is now available for use in the Northern Great Plains and Intermountain valleys of Montana and Wyoming for numerous woody plant conservation practices. As a Selected Class release, this selection will be referred to as Ekalaka Germplasm bur oak, USDA Natural Resources Conservation Service (NRCS) accession number 9087732.

JUSTIFICATION

Justification for alternative release is based on an urgent need for well-adapted plant materials for windbreaks, shelterbelts, riparian forest buffers, and wildlife plantings in the Great Plains and Intermountain West. In addition, the emergence of the emerald ash borer (*Agrilus planipennis*) will create a pressing demand for medium- to tall-stature deciduous trees to replace green ash (*Fraxinus pennsylvanica* Marsh [Oleaceae]) in numerous conservation practices. A move toward discontinuing the use of Russian-olive (*Elaeagnus angustifolia* L. [Elaeagnaceae]) as a conservation species, even to the point of removing and limiting existing plantings and habitats in some circumstances, will create a need for well-adapted alternatives. A lack of tested and adapted germplasm and the potential use of non-adapted seed sources further support Selected Class release. Given this release

originates from a bulk of several Great Plains seed sources, it should prove well adapted to the conditions in the intended geographic area of use. Ekalaka Germplasm bur oak was selected for superior seedling survival, rate of height growth, and vigor rating, relative to other bur oak individual trees and seed sources tested. Ekalaka Germplasm bur oak can also be used in other conservation applications such as reforestation, Xeriscaping®, and woody draw restoration.

COLLECTION SITE INFORMATION

The original Ekalaka Germplasm bur oak seed collections were made in various locations across the Great Plains (Table 1) in support of a bur oak seed provenance study. Wildland bur oak seed collections were made in 1991 and 1992 from individual trees demonstrating superior phenotypic characteristics. These characteristics included single, straight stems with strong apical dominance, well-formed crowns, at least 30 y of age, and the production of abundant crops of sound acorns.

DESCRIPTION

Ekalaka Germplasm bur oak maintains the same general botanical (floral, foliage, fruit, and seed) attributes as the species. It is a medium- to tall-stature deciduous tree with several desirable

attributes including strong branches, drought tolerance, winter hardiness, and freedom from serious insect or disease problems.

Bur oak is capable of growing over a wide range of soil conditions. It is found growing well on rocky hillsides, limestone soils, droughty soils, clayey sites, and other marginal locations given full sun conditions. Bur oak is intolerant of flooding and prolonged soil saturation. A combination of high water use efficiency and a fast-growing tap root enable this species to withstand the dry, windy conditions characteristic of the northern plains. Most references list bur oak as hardy to USDA Winter Hardiness Zone 4, although bur oak grows well in many locations in Montana in Hardiness Zone 3.

On good sites, bur oak has a spreading habit with a broad crown; massive bole; and low, large branches. In Montana and Wyoming, anticipated maximum mature height of bur oak will be approximately 15 m (50 ft). By 10 y of age, Ekalaka Germplasm bur oak averaged 29 cm (11 in) of annual height growth, although some individual trees grew as much as 85 cm (33 in) per year.

No serious insect and disease problems have been observed on Ekalaka Germplasm bur oak, although aphids are a common nuisance pest at Bridger, Montana. Oak webworm, oak skeletonizer, leaf miner, variable oakleaf caterpillar, oak lacebug, and June beetles are listed as pests of bur oak.

TABLE 1

Bur oak seed source origin, Bridger Plant Material Center, Bridger, Montana.

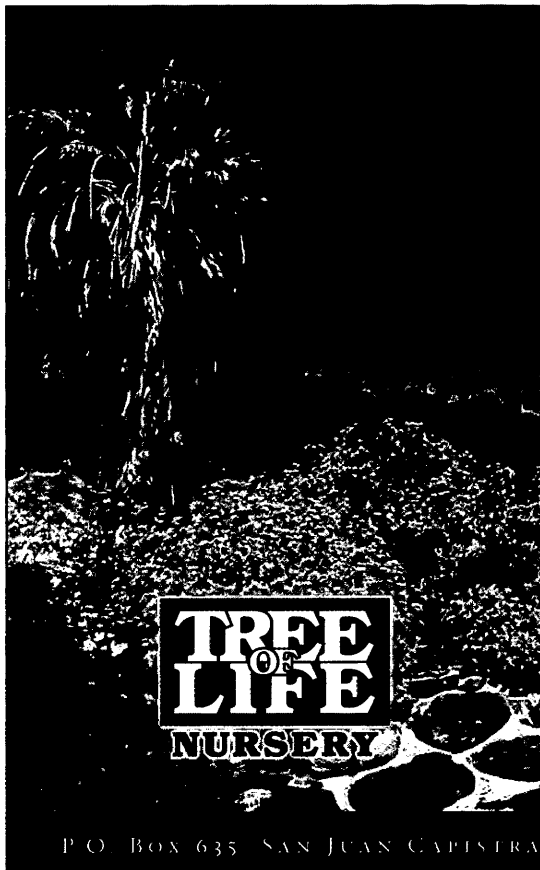
Initial NRCS Accession number	County of origin	State	Number of trees tested	Number of trees selected for Ekalaka Germplasm
9076042	McKenzie	North Dakota	12	0
9076043	Griggs	North Dakota	16	0
9076044	Burleigh	North Dakota	15	6
9076045	Pennington	South Dakota	14	5
9076046	Bottineau	North Dakota	15	0
9076047	Oliver	North Dakota	16	0
9076048	Dunn	North Dakota	14	0
9076049	Carter	Montana	16	0
9076050	Emmons	North Dakota	14	7
9076051	Bottineau	North Dakota	16	0
9076052	Stark	North Dakota	16	0
9076053	Oliver	North Dakota	16	9
9076054	McKenzie	North Dakota	14	0
9076055	Burleigh	North Dakota	16	11
9076056	Burleigh	North Dakota	16	0
9076057	Sioux	North Dakota	16	9
9076058	Morton	North Dakota	16	0
9076059	Morton	North Dakota	16	0
9076060	Emmons	North Dakota	16	0
9076061	Carter	Montana	16	6
9076062	Carter	Montana	16	7
9076063	Carter	Montana	16	7
9076064	Carter	Montana	16	0
9076065	Carter	Montana	16	0
Total:			370	67

METHOD OF SELECTION

Ekalaka Germplasm bur oak is released as a "Natural-Track" germplasm, that is, it is being increased without purposeful manipulation. This selection resulted from field testing of 24 bur oak seed sources from Montana, North Dakota, and South Dakota. All seed sources were field tested for 10 y in a replicated dry-land study at Bridger, Montana, prior to selection. Selection was based on a combination of descriptive statistics (percentage survival, rate of height growth, and vigor rating at or above the overall population mean), a visual (subjective)

field review of each tree within a family (seed source), and statistical analyses. In general, seed sources with mean percentage survival, height growth, and vigor rating at or above overall population means were considered. Additionally, individual trees within a selected seed source that did not meet established mean criteria or that did not appear suitable based on the field inspection were omitted. A total of 67 trees from 9 seed sources from 3 states (Montana, North Dakota, and South Dakota) were selected. Selected seed sources maintained 90% survival until 2003, whereas non-selected and all seed sources main-

tained 80 and 84% survival, respectively. Percentage survival among selected seed sources ranged from 75 to 94%. Selected trees averaged 29 cm (11 in) of height growth in 2003, with individual tree annual growth as high as 85 cm (33 in). Mean annual height growth by seed source ranged from 7 cm (3 in) to 37 cm (15 in). Selected trees averaged 339 cm (134 in) in height in 2003, whereas non-selected and all trees measured 230 cm (90 in) and 253 cm (100 in), respectively. Plant vigor rating of selected trees in 2003 averaged 2.9 ("1" is best), whereas non-selected and all trees averaged 4.1 and 3.8, respectively.



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ECOLOGICAL CONSIDERATIONS

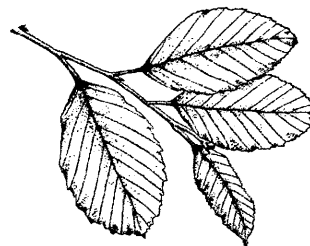
Ekalaka Germplasm bur oak is a long-lived deciduous tree native to Montana and Wyoming. At reproductive maturity it is a prolific seed producer, but is not considered weedy. Bur oak stands readily perpetuate themselves through seed shatter, but the seedlings are sensitive to grazing, flooding, and fire. The species is very tolerant of cold temperatures. Ekalaka Germplasm bur oak passes all criteria for potential weediness in the NRCS Plant Materials Program, Environmental Evaluation of Plant Materials Releases.

ANTICIPATED CONSERVATION USE

Ekalaka Germplasm bur oak has numerous potential conservation applications. It can be used as a medium- to tall-stature tree in windbreak and shelterbelt systems. It provides food for numerous forms of wildlife, as well as nesting, loafing, and roosting sites for many species of birds including turkeys. It can be used in combination with other species in riparian forest buffers, creating shade and providing soil stabilization via an aggressive taproot. Ekalaka Germplasm bur oak may be used as an alternative tree species for Russian-olive in riparian forest buffers when soil salinity is low ($EC < 4$) and prolonged soil saturation does not occur. It may also be used as a replacement for green ash should ash species

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become threatened in the Northern Great Plains and Intermountain West by emerald ash borer.

ANTICIPATED AREA OF ADAPTATION

Ekalaka Germplasm bur oak is a bulk (synthetic) of several seed sources originating from multiple Northern Great Plains collection sites. Although testing of this selection has been limited to the Bridger, Montana, evaluation site, it should perform well across broad areas of eastern Montana and Wyoming, as well as western North Dakota and western South Dakota. Based on field performance data from the Bridger, Montana, test site, as well as the distribution of the species across its native range, Ekalaka Germplasm bur oak is best adapted to elevations of 610 to 1675 m (2,000 to 5,500 ft), performing more favorably on lower elevation (valley) sites.

AVAILABILITY OF PLANT MATERIALS

Generation G1 (Foundation) seeds of Ekalaka Germplasm bur oak will be available from the Bridger Plant Materials Center in Bridger, Montana, through the Foundation Seed Stocks Program at Montana State University-Bozeman or the University of Wyoming. Foundation Class seed stock will be available in the spring of 2010. Commercial production of 2 generations (G2 and G3) beyond G1 are allowed.

REFERENCE

[USDA NRCS] USDA Natural Resources Conservation Service. 2009. The PLANTS database. URL: <http://www.plants.gov> (accessed 15 Dec 2009). Baton Rouge (LA): National Plant Data Center.

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